Webized | Mobile Augmented Reality

Guided by

Prof. Prachi K

Assistant Professor

Dept of CSE

Acharya Institute of Technology.

Presented by

Ajay Kumar B C

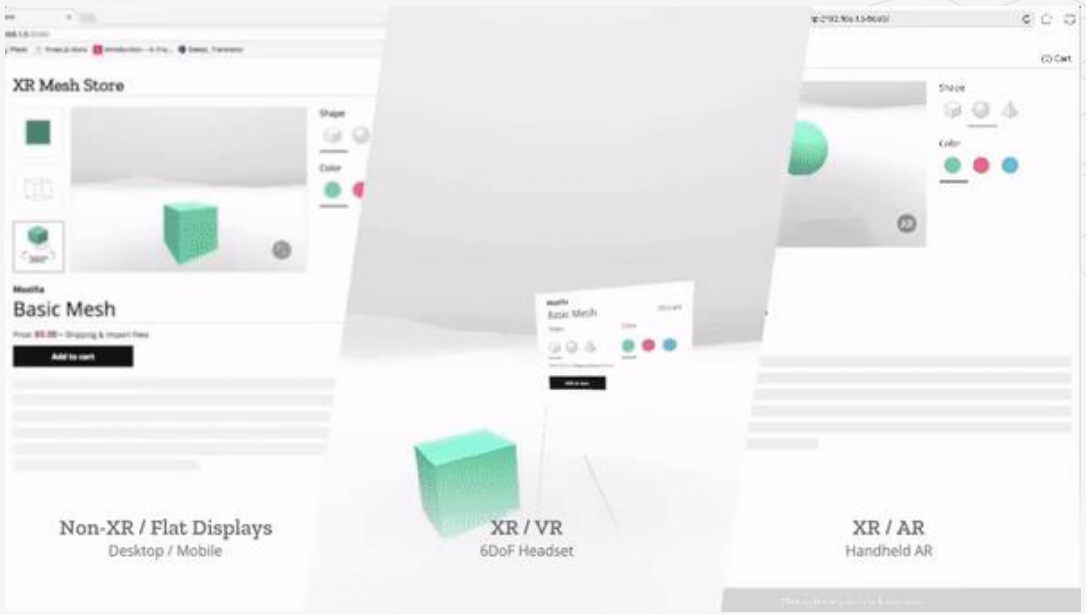
1AY15CS009

VIII sem B.E, CSE

Acharya Institute of Technology

What is Augmented Reality?

- Augmented reality (AR) refers to the system that augments or enhances the user's real time view of the world with computer generated imagery and other inputs, by responding to AR specific events.



- The term "augmented reality" refers to the live direct or indirect view of a physical environment whose elements are augmented by computer-generated content (text, images, videos, 3D models, animations, etc.).

Webizing Augmented Reality!

The AR for Web promises to be one of the most fascinating technology challenges. The scale and overall implications of this field are staggering.

There are many areas for standardization in the AR for Web, Webized/Mobile Augmented Reality (Web/Mobile AR) is gaining increasing attention from both academia and industry.

The two most dominant platforms are :

- Hardware based Mobile AR
- App based Mobile AR

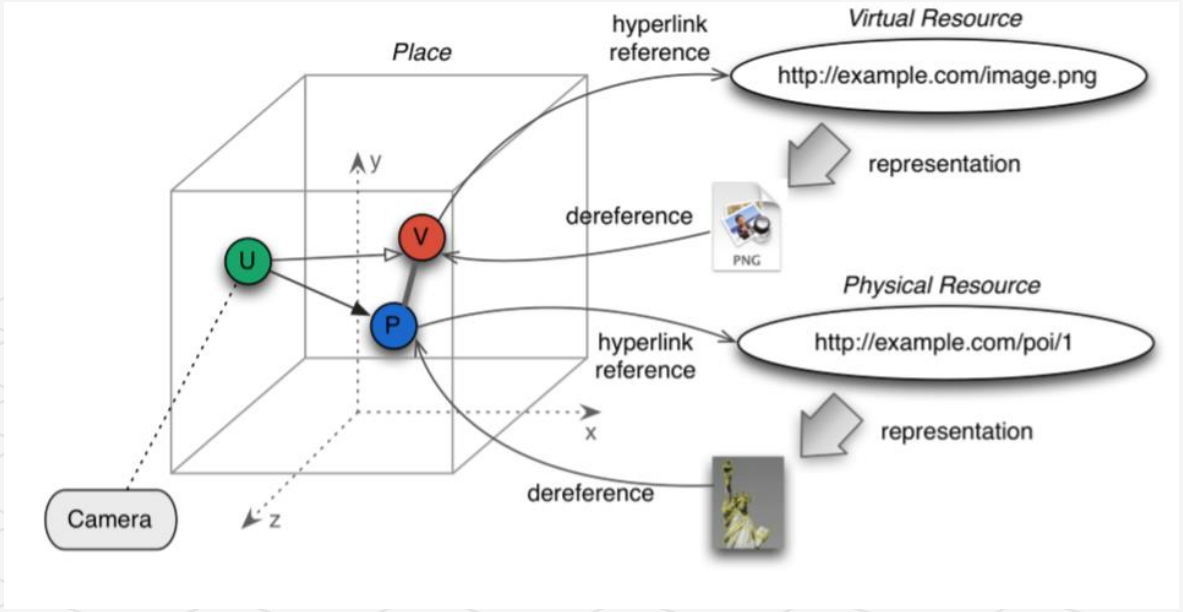
The hardware based Mobile AR implementation is known to be costly and lacks flexibility, while the App-based one requires additional downloading and installation in advance and is inconvenient for cross-platform deployment.

Methodology

- AR content in HTML：

HTML also has the potential to be a container for AR content with physical resources. A hyperlink enables an HTML document to embrace physical resources. Physical resources can be directly embedded in an HTML document. The linked resources are immediately acquired when the document is rendered.

The AR browser uses the camera feed as the background to all tabs, the content area where the web page is displayed is also replicated. A page with transparent background appears augmented. The page's response to ARB events makes it realistic.



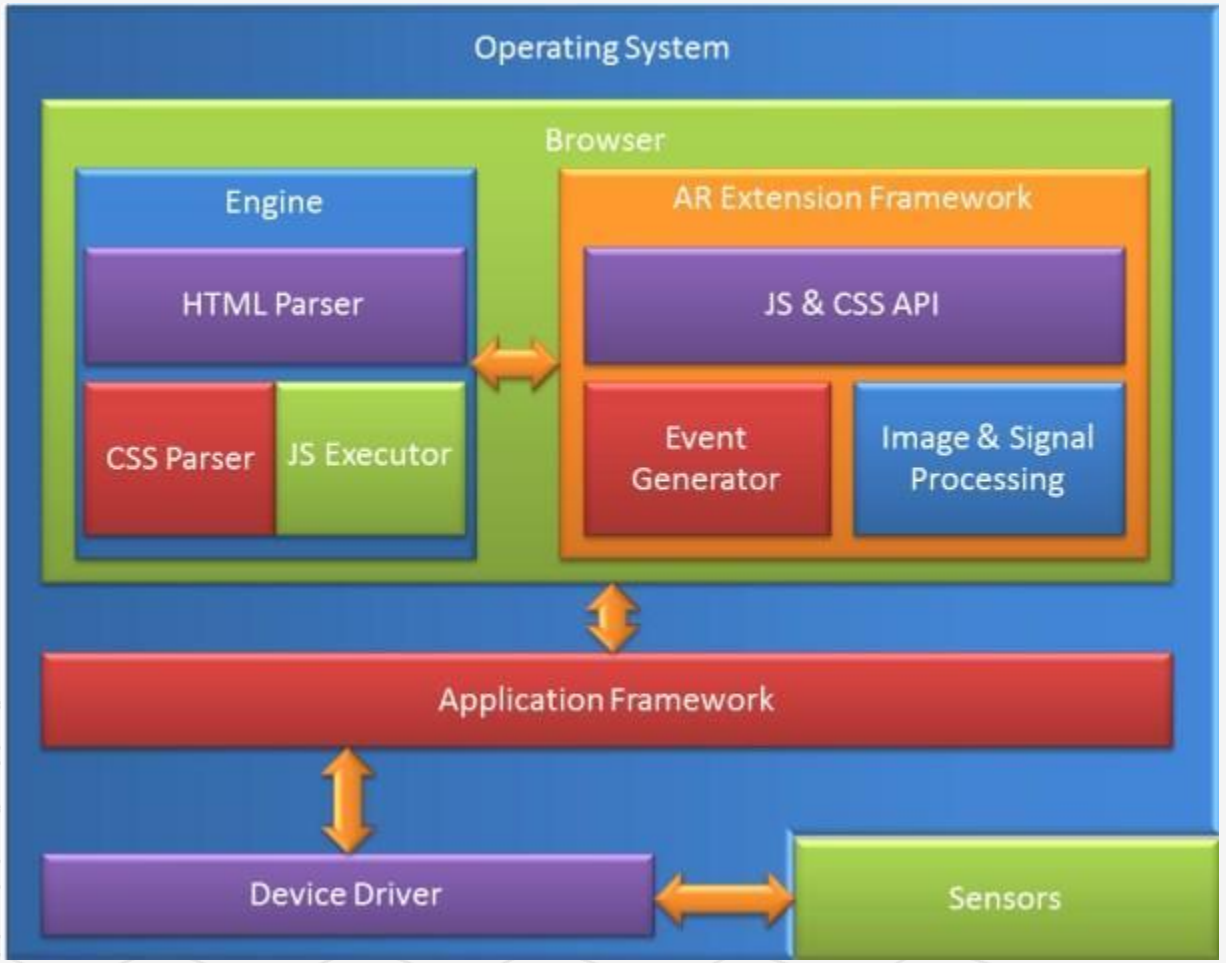
Methodology

The AR extension module observes the data drawn on the LSVs. The frames are converted to grayscale. The converted images are used for edge detection using a convolution matrix.

The browser engine injects a DIV element to the HTML that is at an absolute distance from the screen of the content area and it has the same dimensions as the real-world entity.

The CSS and the JS described for the object kicks in and styles the content based on the DIV. As the identified content is represented as a DIV element the content developer can attach all the existing JS and CSS properties on the same.

For pages that do not support these CSS for AR mode, the engine executes a reader detection algorithm and extracts the readable content and rests the background only for the readable content.



Methodology

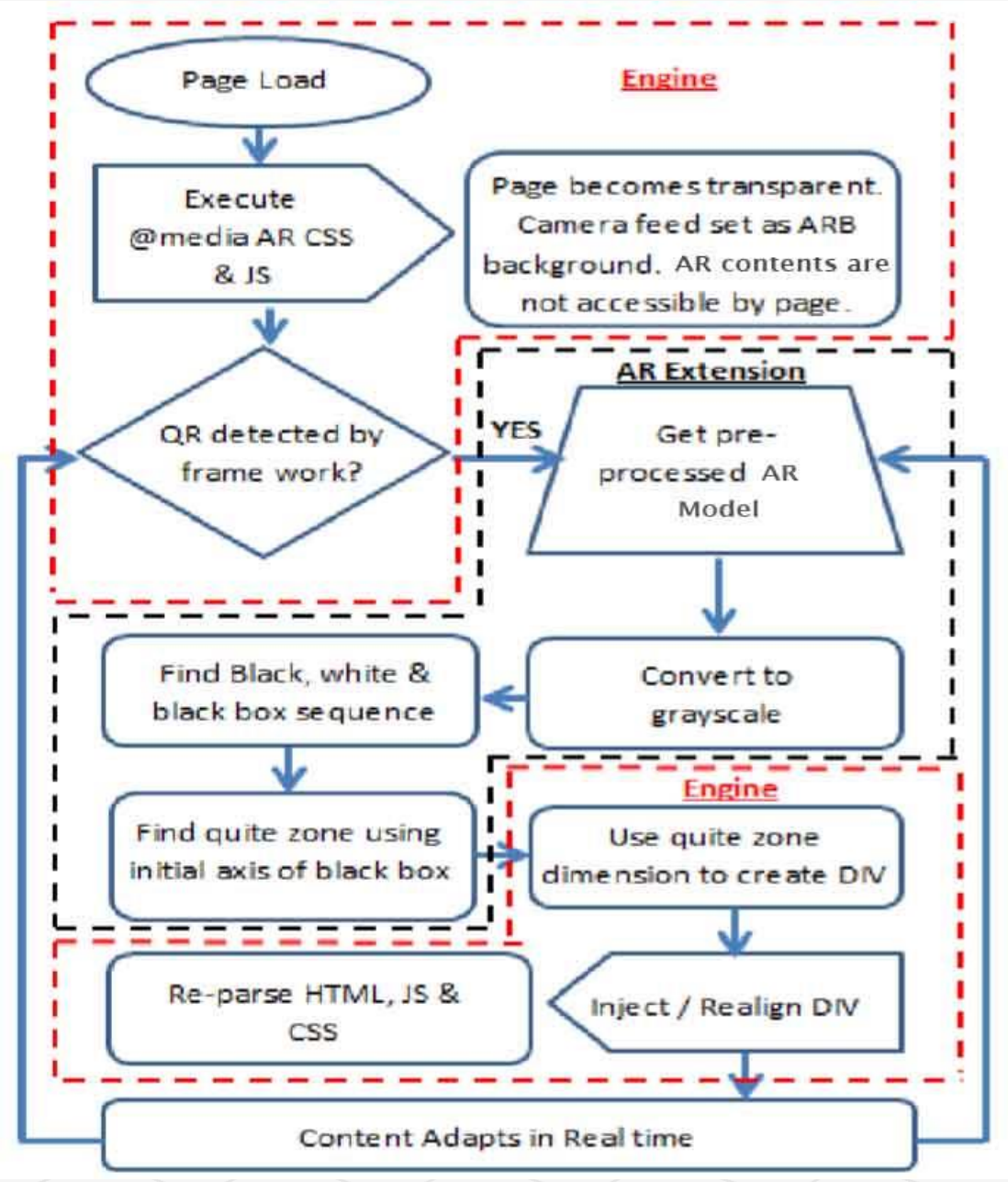
- **Image and Signal Processing Module (ISP) :** This module scans the live stream of video for any event registered by the web page through JS and CSS APIs.

- **Event Generator Module (EG) :** This module is responsible for the generation of different category of events based on the input from the image processing system and the events registered by the web page. The “Event generator” generates different types of events which include the start and end coordinates of the identified region for a JS call-back. And the generator can use any methodology, it can be of both local or cloud.

- **JavaScript and CSS APIs (JCA) :** Here the CSS is handled by considering the identified region as a “DIV” element on the page. Table 1 lists the real-world entities supported by the AR browser supports. Realizing a similar browser engine on an AR operating system has greater ease of implementation as the AR system itself can detect many of these types. The browser can simply register itself to these events and dispatch the events to web page after the required pre-processing.

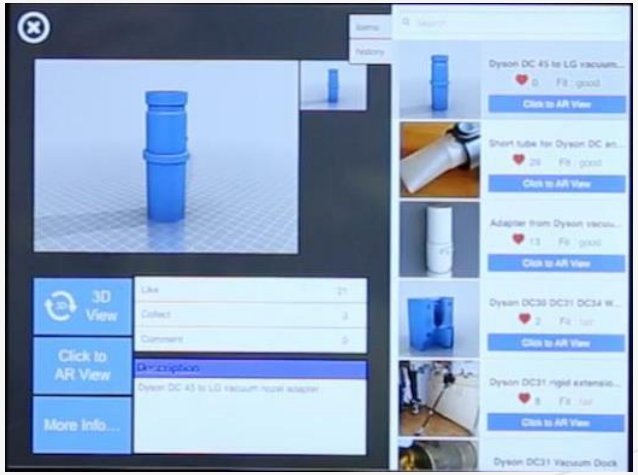
Methodology

When the web page loads on the AR browser, @media selector for the browser selects the CSS, which sets the page background to transparent. The page registers for an AR based event with EG. When the "Application Framework" (AF) detects a QR code, the EG is notified. The EG requests ISP to process the and fetch the QR dimensions. EG passes the dimensions to JCA to generate a DIV element of similar dimensions and value attributes. JCA hands over the DIV to AREF which is passed to the engine for injection. The engine re-renders the page. The process continues so as to respond in real time.



REAL LIFE USE CASES | APPLICATION

3DIY-holic : 3DIY-holic is an AR-aided design and manufacturing agent platform which examines 3D point clouds captured from a depth camera, not only for recognizing existing physical products in the real world, but also for interactive visualization of how virtual CAD models are properly fitted to the products with free viewpoints.



Entertainment : Real-life use cases in the entertainment domain are shown. By using the Insight AR Web browser, AR postcard makes it possible to include a greater variety of contents without limitations in the analogue postcards. Jazz AR demonstrates an example of providing enriched information for a compact disk jacket of a Jazz label and a Jazz musical explanatory book.

REAL LIFE USE CASES | APPLICATION

Military :

- The Head-Mounted Display (HMD) is used by ground troops. Critical data such as enemy location can be presented to the soldier within their line of sight.
- The Heads-Up Display (HUD) is the typical example of augmented reality when it comes to military applications of the technology. A transparent display is positioned directly in the fighter pilot's view.

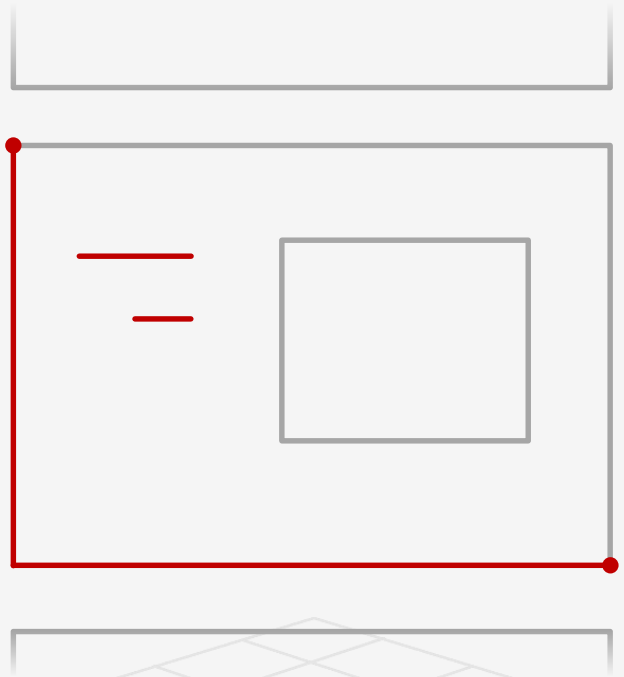
Education :

- ‘Turning the earth’ lets visitors know a variety of environmental issues around the world
- ‘Workbook’ helps students’ study without the effort of making notes of wrong answers on a test
- An AR popup book for children makes it possible to interact with augmented objects.

Conclusion…

Mobile | Web AR provides an attractive visual experience to users. Web AR further offers a lightweight, cross-platform, and pervasive solution on the web. However, it faces more technical challenges like weak computational efficiency of JavaScript and others.

The above provided details of how a browser can be enhanced to take advantage of AR, proposed a new framework and steps to realize it. Further enhancements include a perception of depth instead of a planar representation. The AR Browser opens up a new possibility space for content developers, while simultaneously assuring privacy and security to the end user.




Thank You